OCCUPATIONAL INJURIES AND DISEASES IN ALBERTA

Tar Sands
1995 to 1999

Upstream Oil and Gas
Sub-Sector #6

Alberta
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AND EMPLOYMENT

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1. Introduction

The Mission of Alberta Human Resources and Employment

One of the missions of Alberta Human Resources and Employment is to work in partnership with Albertans to promote safe and healthy workplace, a quality working life and comprehensive safety systems. To this end, Alberta Human Resources and Employment recognises that monitoring health and safety in Alberta will help to ensure primary workplace health and safety concerns are actively managed and prioritised, and resources directed where most needed.

This report summarises the lost-time injuries and disease descriptions, characteristics of the injured worker and the risk of injury to workers in Alberta's upstream oil and gas industries for the years 1995 to 1999. Cost of the injuries and revenue in terms of total premiums paid by employers. Finally, a summary of occupational fatalities accepted by the WCB for compensation and brief descriptions of fatalities investigated by Occupation Health and Safety are also provided.

The purpose of this report is to provide government, employers, workers and health and safety officers in upstream oil and gas industries with information about the industry key health and safety issues.

Description of Upstream Oil and Gas Industries

The upstream oil and gas industries can be subdivided into the following sub-sectors.
Exploration, Oilfield Maintenance and Construction, Well Servicing with Service Rigs and Power Swivels, Drilling of Oil and Gas Wells, Oilfield Downhole and Other Services, Tar Sands, Petroleum Producers, and Oilfield Trucking Services.

The next section gives the descriptions of the Tar Sands sub-sector.

2. Sub-Sector Description

Sub-Sector # 6: Tar Sands

Mining & Processing of Bituminous Sands for Oil Extraction (Industry # 06600)
The industry covers employers engaged in both the mining and the processing of bituminous sands which at this time is exclusive to the Athabasca oil sands deposits.

This is an open pit mining process that removes oil laden sand from the earth and transport this sand to an extraction plant.

Draglines with booms measuring over 100 metres, are equipped with enormous buckets that dig up the oil sand. Bucket wheel excavators, equipped with a series of toothed bucket on a revolving wheel, are used to scoop up the sand and put it on conveyors or loaded onto specialized trucks for transport to an extraction plant. Bitumen is then separated from the sand, in the plant, by a series of automated units using steam and chemical agents. Once the raw bitumen is separated, it is upgraded into synthetic crude oil because it contains impurities, and its too thick and heavy to flow through pipelines.

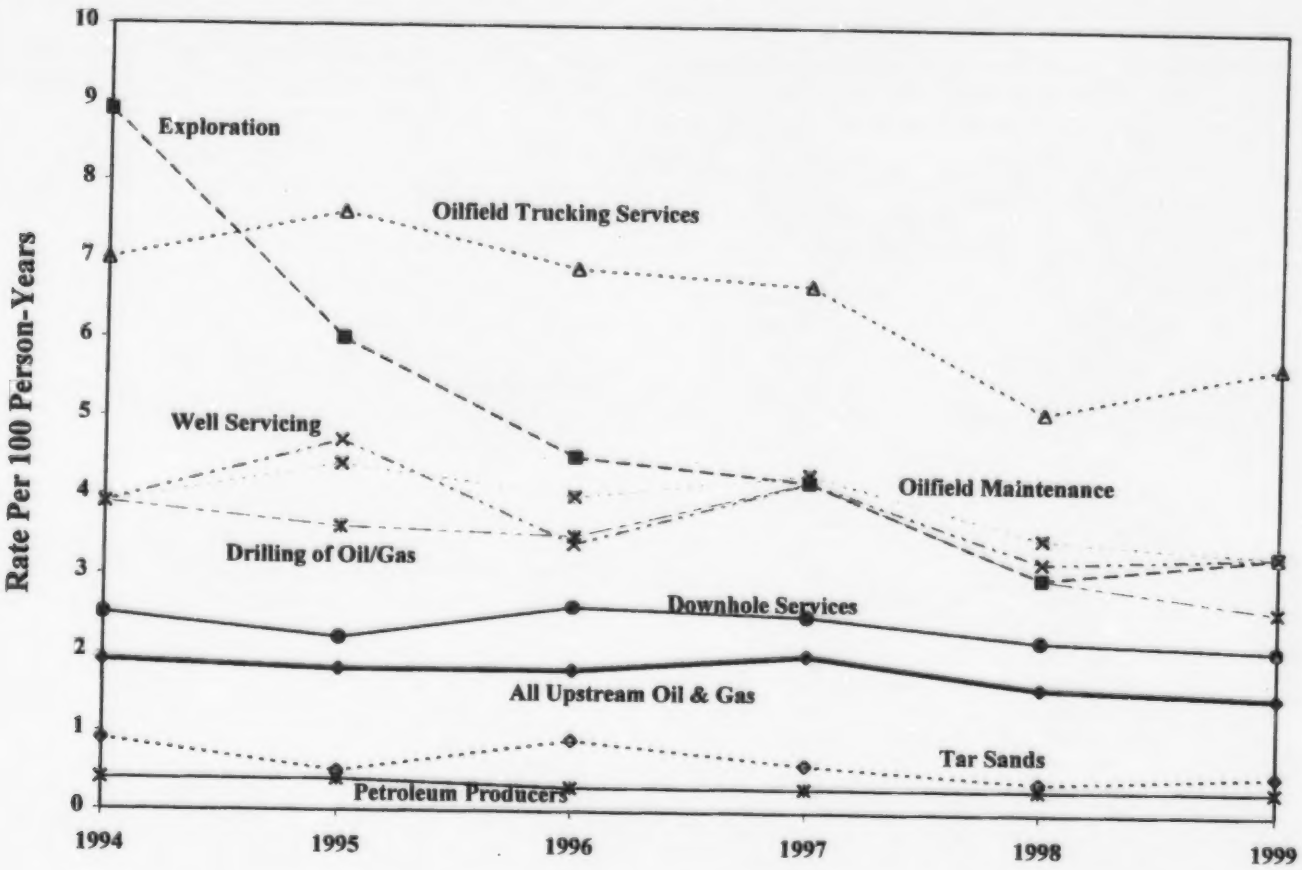
Upgrading units include the coker, that breaks down the bitumen into smaller molecules and the fractionator, which separates the bitumen products into gas, naphtha and gas-oil molecules, removing the impurities. Upgrading plants are comparable to oil refineries in many ways. The end product, synthetic crude oil, is shipped to refineries for further processing into other products such as gasoline, jet fuel and lubricating oil.

Research & Development, Oil Sands & Heavy Oil Recovery (Industry # 06601)
Employers in this industry specialize in research and development into new technologies for recovering oil from heavy oil deposits and bituminous sand through 'in situ' or 'well' recovery methods.

Employers will design and operate test facilities for the research and development purpose. This is purely a research industry and is not intended for exploration or commercial processing activities. Once employers begin operating on a commercial basis, the operation would be classified in industry 06300.

Contract operators may be engaged to operate test facilities and would be classified along with other upstream production operators in industry 06305.

Lost-Time Claim Rates
Upstream Oil & Gas Subsectors
Alberta: 1994-1999



3. Lost-Time Claim Rates and Duration Rates

Tar Sands

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1995	12	$270,824	6,975	519	7	37	0.5
1996	11	$132,309	6,051	539	9	54	0.9
1997	11	$145,657	6,025	702	12	35	0.6
1998	14	$52,662	6,921	306	N/A	26	0.4
1999	16	$99,510	6,978	562	8	32	0.5

3.1 LTC Rate by Industry

6600-Mining & Processing of Bituminous Sand

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1995	10	$270,824	6,943	519	7	37	0.5
1996	8	$131,691	6,023	536	9	53	0.9
1997	8	$145,657	6,002	702	12	35	0.6
1998	11	$52,662	6,900	306	N/A	26	0.4
1999	12	$99,510	6,958	562	8	32	0.5

6601-Research/Development of Oil Sands & Heavy Oil Recovery

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1995	2	$0	32	0	N/A	0	N/A
1996	3	$618	28	3	N/A	1	N/A
1997	3	$0	23	0	N/A	0	N/A
1998	3	$0	22	0	N/A	0	N/A
1999	4	$0	20	0	N/A	0	N/A

3.2 LTC Rates by Size of Employer: 1999

Size of Employer	# of Accounts	LTCs	Person - Years	LTC Rate
A: 0< PY <=1	1	N/A	1	N/A
B: 1 < PYs < 5	6	N/A	14	N/A
C: 5 <= PYs < 10	2	N/A	18	N/A
D: 10 <= PYs < 20	2	N/A	28	N/A
F: 40 <= PYs < 100	1	N/A	84	N/A
G: PYs >=100	2	32	6,834	0.5
H: Invalid	2	N/A	0	N/A
Total	16	32	6,978	0.5

4. Analysis of the Lost-Time Claims

4.1 Nature of Injury

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
SPRAIN, STRAIN, TEARS	13	22	10	15	11	71	38.6
SYSTEMIC DISEASES,DISORDERS	11	13	6	3	2	35	19.0
SURFACE WOUNDS, BRUISES	3	6	3	2	7	21	11.4
FRACTURE, DISLOCATION	3	5	6	.	2	16	8.7
OTHER TRAUMATIC INJURIES/DISEASE	2	1	3	2	4	12	6.5
OPEN WOUNDS	2	3	4	2	1	12	6.5
BURNS	2	1	1	1	3	8	4.3
SYMPTOMS, SIGN/ILL-DEFINED CONDITIONS	.	.	1	.	.	1	0.5
OTHER DISEASE,CONDITIONS,DISORDERS	.	1	.	.	.	1	0.5
NATURE-UNKNOWN	1	2	1	1	2	7	3.8
Total	37	54	35	26	32	184	100.0

4.2 Duration of Disability

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: 01 Day	5	8	1	2	4	20	10.9
B: 02 Days	2	4	3	.	4	13	7.1
C: 03 - 05 Days	6	9	6	2	4	27	14.7
D: 06 - 10 Days	2	4	3	4	1	14	7.6
E: 11 - 20 Days	4	5	5	3	4	21	11.4
F: 21 - 30 Days	4	3	3	2	.	12	6.5
G: 31 Days OR More	6	5	6	4	6	27	14.7
H: Unspecified	8	16	8	9	9	50	27.2
Total	37	54	35	26	32	184	100.0

4.3 Type of Event/Exposure

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
EXPOSURE TO HARMFUL SUBSTANCES	8	12	8	2	7	37	20.1
OVEREXERTION	5	8	3	5	5	26	14.1
BODILY REACTION	7	7	1	2	5	22	12.0
FALL ON SAME LEVEL	4	6	2	3	4	19	10.3
STRUCK BY OBJECTS	3	5	5	1	3	17	9.2
TRANSPORTATION ACCIDENTS	2	4	3	6	2	17	9.2
FALL TO LOWER LEVEL	3	.	5	2	2	12	6.5
CAUGHT IN OBJECTS	.	4	3	.	.	7	3.8
REPETITIVE MOTIONS	.	2	2	1	.	5	2.7
STRUCK AGAINST OBJECTS	.	1	1	1	1	4	2.2
OTHER FALLS	.	1	1	.	1	3	1.6
RUBBED OR ABRADED	.	1	.	.	2	3	1.6
FIRES AND EXPLOSIONS	.	1	.	1	.	2	1.1
OTHER BODILY REACTION/EXERTION	.	.	.	1	.	1	0.5
UNKNOWN	5	2	1	1	.	9	4.9
Total	37	54	35	26	32	184	100.0

4.4 Part of Body Injured

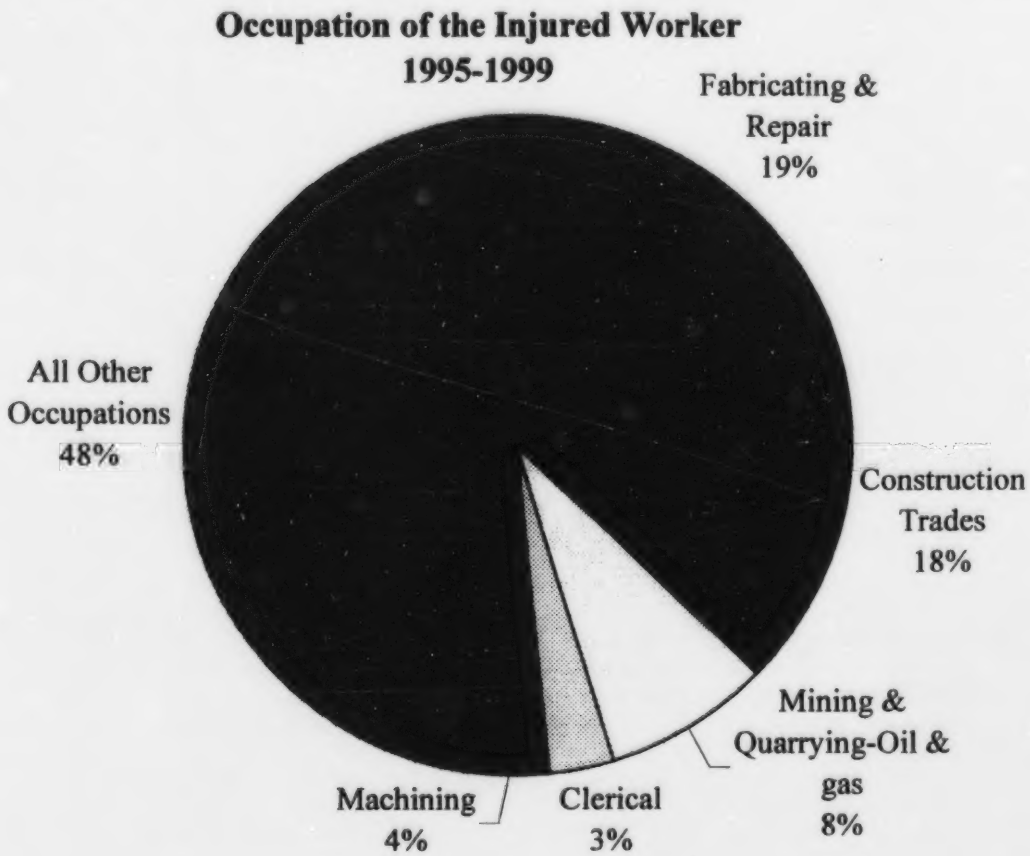
LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
BACK	9	14	7	9	8	47	25.5
OTHER HEAD	6	15	7	3	2	33	17.9
ANKLE(S) & FOOT(FEET)-NOT TOES	2	8	2	4	4	20	10.9
LEG(S)	3	7	6	1	1	18	9.8
OTHER TRUNK	5	.	3	2	6	16	8.7
OTHER UPPER EXTREMITIES	.	2	1	3	4	10	5.4
NECK	4	2	1	2	.	9	4.9
MULTIPLE BODY PARTS	2	1	2	1	3	9	4.9
WRIST(S)/HAND(S)	3	2	2	1	.	8	4.3
FINGER(S)	1	2	2	.	.	5	2.7
BODY SYSTEMS	2	.	.	.	1	3	1.6
EYE(S)	.	.	.	.	3	3	1.6
OTHER LOWER EXTREMITIES	.	.	2	.	.	2	1.1
OTHER BODY PARTS	.	1	.	.	.	1	0.5
Total	37	54	35	26	32	184	100.0

4.5 Source of Injury

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
OTHER SOURCES	9	13	4	1	8	35	19.0
STRUCTURES/SURFACES	5	7	8	5	6	31	16.8
PERSONS-INJURED WORKER	7	9	3	4	5	28	15.2
VEHICLES	3	6	3	5	1	18	9.8
PARTS AND MATERIALS	2	3	4	2	2	13	7.1
MACHINERY	.	2	1	2	2	7	3.8
CHEMICAL/CHEMICAL PRODUCTS	1	.	3	1	2	7	3.8
HANDTOOLS-UNPOWERED	.	4	1	1	.	6	3.3
CONTAINERS	1	1	.	.	2	4	2.2
OTHER TOOLS/EQUIPMENTS	1	.	.	1	1	4	2.2
HANDTOOLS-POWERED	.	.	.	1	1	2	1.1
FURNITURE AND FIXTURES	.	.	.	.	1	1	0.5
PERSONS-OTHER THAN INJURED WORKER	.	.	.	1	.	1	0.5
MINERALS-METALS/NONMETALLIC	.	.	.	1	.	1	0.5
UNKNOWN	8	9	7	1	1	26	14.1
Total	37	54	35	26	32	184	100.0

5. Characteristics of the Injured Worker

5.1 Occupation of the Injured Worker



5.2 Age of injured Worker

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: 15 - 19 Years	.	.	1	1	1	3	1.6
B: 20 - 24 Years	.	1	.	1	1	3	1.6
C: 25 - 34 Years	12	9	5	4	3	33	17.9
D: 35 - 44 Years	14	22	18	9	11	74	40.2
E: 45 - 54 Years	8	15	9	9	13	54	29.3
F: 55+ Years	3	7	2	2	3	17	9.2
Total	37	54	35	26	32	184	100.0

5.3 Length of Time Employed

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: LESS THAN 1 MONTH	1	.	.	.	.	1	0.5
B: 1 MONTH TO < 6 MONTHS	1	.	1	1	2	5	2.7
C: 6 MONTHS TO < 1 YEAR	.	.	.	1	1	2	1.1
D: 1 YEAR OR MORE	27	33	21	16	21	118	64.1
E: TIME UNSPECIFIED	8	21	13	8	8	58	31.5
Total	37	54	35	26	32	184	100.0

5.4 Gender of Injured Worker

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
MALES	31	47	32	21	27	158	85.9
FEMALES	6	6	3	5	5	25	13.6
UNSPECIFIED	.	1	.	.	.	1	0.5
Total	37	54	35	26	32	184	100.0

6. Cost of Claims and Employer Premiums

Sub-Sector 6- Tar Sands

	OCCURRENCE YEAR				
	1995	**1996**	**1997**	**1998**	**1999**
TRANSACTION YEAR					
1995	$239,803				
1996	$116,780	$116,332			
1997	$11,074	$212,734	$106,468		
1998	$11,287	$11,317	$161,791	$66,470	
1999	$26,496	$4,598	$33,334	$55,045	$159,420
Total Cost	$405,440	$344,980	$301,593	$121,515	$159,420
Total Premiums	$1,801,724	$1,739,810	$2,214,956	$1,339,409	$1,035,131

The above cost of lost-time claims and premiums are for the five-year period 1995 through to 1999. The data is as at July 6, 2000.

The claim cost reflects only paid cost on lost-time claims that occurred in the five-year period. These costs are tracked by year of occurrence and the year that the costs were transacted.

The premiums are the total premiums paid by employers for each year.

7. Occupational Fatalities

An occupational fatality is the death of a worker that results from a work-related incident or exposure. Alberta Human Resources and Employment classifies occupational fatalities into three general types: motor vehicle incident, workplace incident and occupational diseases. Each is described in detail below.

Motor Vehicle Incident

Motor vehicle incidents typically involve highway vehicles operating on public roads in which the fatally injured worker was either the driver or a passenger. This category also includes fatalities involving aircraft crashes, train crashes, helicopter crashes, etc.

Workplace Incident

Fatal workplace incidents consist of cases in which the worker dies at a work site, or as a result of injuries sustained at a work site. It is this type of fatality that Alberta Human Resources and Employment may be responsible for investigating.

Occupational Diseases

Occupational disease fatalities consist mostly of recognized occupational disease, that is, disease known to be primarily or exclusively work-related (e.g. asbestosis, black lung disease). Occupational diseases are frequently diagnosed many years after the initial or crucial exposure to the toxic substance, and in such cases it is very difficult to determine when the fatal exposure occurred. Thus, the occupational disease category should not be interpreted to reflect present work site hazardous conditions or exposures.

Each year the Workers' Compensation Board (WCB) accepts some occupational fatality claims for compensation. Occupational fatality claims that were accepted in a particular year may include fatalities from prior years.

Description of Tar Sands Workplace Fatalities Accepted by the WCB

Year	Occupational Disease		Motor Vehicle incident		Workplace Incident		Total	
	N	%	N	%	N	%	N	%
1995	1	50.0	0	0.0	1	50.0	2	100
1996	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
Total	1	50.0	0	0.0	1	50.0	2	100

8. OHS Investigated Occupational Fatalities: 1995-1999

YEAR:	1995	FILE:	0818
OCCUPATION:	Ground Hand	AGE:	31
INDUSTRY:	Mining and Processing of Bituminous Sand for Oil Extraction		
EXPERIENCE:	Unknown		

DESCRIPTION: The replacement grounds-man was on the ground helping the cable tractor operator to relocate the draglines power cable. This routine operation involves moving power cable with the cable tractor, so the walking shoes of the dragline would not step down onto the cable in the walking mode. After relocating the cable, the grounds-man was directing the dragline operator to align the shoes in preparation for walking back to the previous location to resume excavation. The grounds-man was in a crouched position with his back to and in direct line of travel of the reversing cable tractor. The back-up alarm on the tractor was not working. The tractor operator was unaware of the presence of the grounds-man, and the grounds-man did not sense the approaching tractor. The dragline operator tried to warn the grounds-man by blowing the dragline horn. He did not succeed in capturing the attention of the grounds-man. The dragline operator then used the radio to get the tractor operator to stop the equipment, but grabbed the wrong transmitter. By the time he had communicated with the tractor operator, the grounds-man had been hit and run over by the cable tractor.

Appendix A: Terms, Definitions, and Formulas

Lost-Time Claim

A lost-time claim (LTC) is a claim for an occupational injury or disease which disables the worker beyond the day of injury. Included are claims for which wages compensation are paid, permanent disability claims, fatalities, and cases in which the injured worker is assigned light duties or other modified work.

Person-Years

Person-year estimates are calculated from wage and payroll data provided by account holders to the WCB. Alberta Labour uses these data to estimate. An average industry wage, and uses the average industry wage and employer payroll data to estimate person-years foe each employer and each industry. One person-year i.e. equivalent to one full-time worker working for one year, and can be assumed to equal 2,000 hours worked.

LTC Rate

The lost-time claim (LTC) rate is calculated by dividing the number of lost-time claims by the person-year estimate, and multiplying the result by 100. The LTC rate represent the probability or risk of disabling injury or disease to a worker during a period of one year's work. Comparisons of LTC rates between industries, or between years, can be used to indicate increases, decreases, or differences in this risk.

$$\text{LTC Rate} = \frac{\text{Number of LTCs X 100}}{\text{Estimated Person-years}}$$

Duration (Days Lost)

The duration of disability is the number of days following the injury or disease for which the worker was disabled, and unable to perform normal work duties. This information is obtained for this report from data on compensation days paid on each claim from WCB. Alberta Labour obtains these data on March 31 of the year following the claim year, and does not update the information, even though many injured workers continue to be disabled beyond this date. As a result, the duration information reported here underestimates the true impact of lost-time injury and disease.

Duration Rate

The duration rate is calculated by dividing the number of work days lost (disability days) by the person-year estimate, and multiplying by 100. The result is expressed as "days lost per 100 person-years worked", and indicates, in part, the economic impact of occupational injury and disease. Duration rates are not recommended as reliable indicators of full economic cost. In addition, readers are warned that duration rates are highly unstable when based on only a few lost-time claims; it is recommended that the duration rate not be calculated based upon fewer than 30 lost-time claims.

$$\text{Duration Rate} = \frac{\text{Disability Days X 100}}{\text{Estimated Person-Years}}$$

WCB Accepted Fatality

An occupational fatality is the death of a worker which result from a work-related incident or exposure and which has been accepted by the WCB for compensation. A fatality is counted in the year it is accepted.

NEC

Means "Not Elsewhere Classified'

UNS

Means "Unspecified"

Appendix B: Upstream Oil and Gas 1999 Industry Codes

Sub-Sector 1: **Exploration**
Industries:
09200~Seismic Geophysical/Mineral Exploration
09201~Shot Hole Drilling

Sub-Sector 2: **Oilfield Maintenance and Construction**
Industries:
06304~Oilfield Construction and/or Maintenance

Sub-Sector 3: **Well Servicing With Service Rigs**
Industries:
09903~Well servicing with Service Rigs including Power Swivels

Sub-Sector 4: **Drilling of Oil and gas Wells**
Industries:
09600~Drilling of Oil & Gas Wells

Sub-Sector 5: **Downhole & Other Oilfield Services**
Industries
06305~Field Production Operators
06306~Vacuum Removal of Waste
09900~Mud Logging
09902~Pressure Cleaning Services
09904~Rathole Drilling and Rig Anchoring
09911~Oilfield Downhole Services
09915~Well Casing Services
09921~Servicing Christmas Trees On Oil Wells
09927~Liquid Waste Treatment & Disposal

Sub-Sector 6: **Tar Sands**
Industries:
06600~Mining & Processing of Bituminous Sand
06601~Research/Development, Oil Sands and Heavy Oil Recovery

Sub-Sector 7: **Oil & Gas Exploration/Development**
Industries:
06300~Oil and Gas Exploration & Development-Upstream Operations

Sub-Sector 8: **Oilfield Trucking Services**
Industries:
50720~Oilfield Trucking Services